

### **Listing of Claims:**

1. (Original) A supported metallic compound comprising a support based on aluminium oxide onto which a tungsten hydride is grafted.
2. (Previously Presented) A compound according to claim 1, wherein the support is selected from among supports with a homogenous composition based on aluminium oxide and from among heterogeneous supports based on aluminium oxide comprising aluminium oxide essentially at the surface of said supports.
3. (Previously Presented) A compound according to claim 1, wherein the support has a specific surface area (BET) selected in a range of from 0.1 to 1000 m<sup>2</sup>/g.
4. (Previously Presented) A compound according to claim 1, wherein the support comprises aluminium oxide, mixed aluminium oxides or modified aluminium oxides.
5. (Previously Presented) A compound according to claim 4, wherein the support comprises aluminium oxide selected from among porous aluminas, non-porous aluminas and mesoporous aluminas.
6. (Previously Presented) A compound according to claim 5, wherein the porous alumina is selected from among  $\gamma$ -alumina,  $\eta$ -alumina,  $\delta$ -alumina,  $\theta$ -alumina,  $\kappa$ -alumina,  $\rho$ -alumina and  $\chi$ -alumina.
7. (Previously Presented) A compound according to claim 6, wherein the porous alumina has a specific surface area (BET) in a range of from 100 to 1000 m<sup>2</sup>/g.
8. (Previously Presented) A compound according to claim 5, the non-porous alumina is  $\alpha$ -alumina.

9. (Previously Presented) A compound according to claim 8, wherein the non-porous alumina has a specific surface area (BET) in a range of from 0.1 to 300 m<sup>2</sup>/g.
10. (Previously Presented) A compound according to claim 6, wherein the porous alumina comprises a mixture of one or more crystalline forms of porous aluminas with  $\alpha$ -alumina
11. (Previously Presented) A compound according to claim 4, wherein the mixed aluminium oxides are selected from among aluminium oxides combined with at least one other oxide in a proportion by weight of from 2 to less than 80%.
12. (Previously Presented) A compound according to claim 11, wherein the other oxide(s) are oxides of the elements, M, selected from among the metals of groups 1 to 13 and the elements of group 14, with the exception of carbon, of the periodic table of the elements.
13. (Previously Presented) A compound according to claim 11, wherein the other oxide(s) are selected from among oxides of alkali metals, of alkaline-earth metals, of transition metals and of the elements of groups 13 and 14, with the exception of carbon, of the periodic table of the elements.
14. (Previously Presented) A compound according to claim 4, wherein the modified aluminium oxides comprise one or more of the elements of groups 16 or 17 of the periodic table of the elements.
15. (Previously Presented) A compound according to claim 1, wherein it assumes the form of particles having an average size of from 10 nm to 5  $\mu$ m.
16. (Previously Presented) A compound according to claim 1, wherein the oxidation state of the tungsten has a value selected in a range of from 2 to 6.

17. (Previously Presented) A compound according to claim 1, wherein the tungsten atom is attached to one or more hydrogen atoms and optionally to one or more hydrocarbon residues, R.

18. (Previously Presented) A compound according to claim 17, wherein the hydrocarbon residues R are identical or different, saturated or unsaturated hydrocarbon residues and optionally comprising silicon.

19. (Previously Presented) A compound according to claim 1, wherein the tungsten atom is complexed by one or more hydrocarbon ligands.

20. (Previously Presented) A compound according to claim 1, wherein, under infrared spectroscopy, it exhibits at least one of the two absorption bands at 1903 and 1804  $\text{cm}^{-1}$ .

21. (Previously Presented) A compound according to claim 1, wherein, when examined by proton nuclear magnetic resonance (solid  $^1\text{H}$ -NMR) at 500 MHz, it exhibits a tungsten hydride chemical shift value ( $\delta_{\text{W-H}}$ ) equal to 10.6 ppm.

22. (Previously Presented) A method for production of the compound according to claim 1, wherein it comprises (1) a dispersion and grafting step of an organometallic tungsten precursor, Pr, onto a support based on aluminium oxide, in which precursor the tungsten is attached or complexed to at least one hydrocarbon ligand, so as to form a hydrocarbon compound or complex of tungsten grafted onto said support, then (2) a hydrogenolysis step of the grafted hydrocarbon compound or complex of tungsten, arising from the preceding step, so as to form a tungsten hydride grafted onto said support.

23. (Previously Presented) A method according to claim 22, wherein the support based on aluminium oxide is subjected to a prior calcination and/or dehydroxylation step.

24. (Previously Presented) A method according to claim 22, wherein the dispersion and grafting step is performed by sublimation, by impregnation with the assistance of a solvent, or by dry mixing.

25. (Previously Presented) A method according to claim 22, wherein the hydrogenolysis step is performed by contacting the grafted hydrocarbon compound or complex of tungsten with hydrogen or a reducing agent.

26. (Previously Presented) A method of carrying out hydrocarbon cleavage and recombination reactions comprising reacting one or more hydrocarbons using the compound according to claim 1 as a catalyst.

27. (Previously Presented) A method of carrying out a metathesis reaction comprising reacting one or more hydrocarbons using the compound according to claim 1 as a catalyst.

28. (Previously Presented) A method for manufacturing hydrocarbon(s) having a modified carbon skeleton comprising reacting at least one aliphatic hydrocarbon with itself, or with at least one other aliphatic hydrocarbon, or with at least one aromatic or cyclanic hydrocarbon substituted by at least one alkyl residue using the compound according to claim 1 as a catalyst.

29. (Previously Presented) The method according to claim 28, wherein the aliphatic hydrocarbon is selected from among linear aliphatic hydrocarbons, and branched aliphatic hydrocarbons, the aromatic hydrocarbon substituted by at least one alkyl residue is selected from among substituted aromatic hydrocarbons from C<sub>7</sub> to C<sub>30</sub> with at least one linear or branched alkyl residue, and the cyclanic hydrocarbon substituted by at least one alkyl residue is selected from among substituted cyclanic hydrocarbons from C<sub>4</sub> to C<sub>30</sub> with at least one linear or branched alkyl residue.

30. (Previously Presented) A method for manufacturing hydrocarbon(s) comprising reacting methane with at least one other aliphatic hydrocarbon, or with at least one aromatic or cyclanic hydrocarbon substituted by at least one alkyl residue using the compound according to claim 1 as a catalyst.

31. (Previously Presented) A method for manufacturing alkane(s), comprising reacting methane with itself by using the compound according to claim 1 as a catalyst.

32. (Previously Presented) A method for manufacturing hydrocarbon(s) by a crossed metathesis reaction comprising reacting at least one starting hydrocarbon and the compound of claim 1, wherein the compound of claim 1 is used as a catalyst.

33. (Previously Presented) A method for manufacturing hydrocarbon(s) or hydrocarbon oligomer(s) or polymer(s) with a modified carbon skeleton comprising reacting a starting hydrocarbon polymer with hydrogen by using the compound according to claim 1 as a catalyst.

34. (Previously Presented) A compound according to claim 14, wherein the modified aluminum oxides are selected from superacids of alumina and sulfated, sulfided, fluorinated and chlorinated aluminum oxides.